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Voluntary Appointment of Independent Directors: Evidence from Taiwan

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Voluntary Appointment of Independent Directors: Evidence from Taiwan

Abstract

Purpose: Using a dataset of Taiwanese listed firms from 2002 to 2015, we empirically examine the determinants to voluntarily appoint independent directors.

Design/methodology/approach: We employ the panel estimation to exploit both the cross-section and time-series nature of the data. Further, we use Tobit regression, generalised linear model in the additional analysis, as well as the two-stage least squares to mitigate for a possible endogeneity issue.

Findings: The main findings show that Taiwanese firms with large board size tend to voluntarily appoint independent directors, and firms that already have independent supervisors more willingly to accept additional independent directors onto the board. Furthermore, ownership concentration and institutional ownership are positively associated with the voluntary appointment of independent directors. On the contrary, firms controlled by family members are generally reluctant to voluntarily appoint independent directors.

Research implications/limitations: Our findings are important for managers, shareholders, creditors and policy makers. In particular, when considering the determinants of the voluntary appointment of independent directors, our results indicate that independent supervisors, outside shareholders and institutional investors are significant factors in influencing effective internal and external corporate governance mechanisms. This research work on focuses on the voluntary appointment of independent directors. It would be interesting to compare the effectiveness of voluntary appointment with mandatory appointment within Taiwan as well as with other jurisdictions.

Originality/value: This study incrementally contributes to the corporate governance literature in several ways. First, this study extends the earlier research by using a more comprehensive dataset of non-financial Taiwanese firms, as well as employing alternative methodologies to investigate the determinants of voluntary appointment of independent directors. Second, prior studies tend to neglect the possible issue of using a censored and fractional dependent variable, the proportion of independent directors, which might yield biased and inconsistent parameter estimates when using OLS regression estimation. Finally, this study addresses the relevant econometric issues by using the Tobit, generalised linear model as well as the two stage least squares for a possible endogeneity concern.

1. Introduction

The global financial crisis and numerous corporate debacles have prompted extensive internal corporate governance reforms across different jurisdictions. In the U.S, for example, the Congress passed the Sarbanes-Oxley Act (SOX) in 2002, which requires companies to strengthen their corporate governance by stipulating that every public company has to establish an audit committee, which must consist solely of independent directors. Similarly, The U.K. corporate governance code states that at least one-third of the total number of directors on the board should be non-executive directors. Elsewhere, many jurisdictions including China, India, South Korea, Malaysia and Singapore also adopted similar corporate governance reforms and required listed firms to appoint independent directors (Black and Kim, 2012). Taiwan, which is the focus of this study, has also implemented a series of reforms to enhance its corporate governance mechanisms, and one of the most dramatic reforms was to introduce an independent director system. In particular, from February 2002, firms that apply for initial public offerings on the Taiwan Stock Exchange (TWSE) have been required, to appoint at least two independent directors. However, this rule is not applicable to firms listed before that date, which are free to voluntarily appoint independent directors. Hence, Taiwanese listed firms can be divided into two groups, i.e. one is required by the authorities to appoint independent directors, while the other is encouraged but not forced to appoint independent directors. Unlike the aforementioned countries that have strictly demanded all listed firms to enhance board independence since the initial stage of their corporate governance reforms, the new regulation in Taiwan has a unique setting, i.e., 'stringent enforcement' for firms that went public after February 2002 and 'flexible encouragement' for firms that were listed prior to February 2002. We take advantage of this exclusive setting which is considerably different from that of other countries, and in doing so, we examine the determinants for existing Taiwanese listed firms with the discretionary right to voluntarily appoint independent directors.

One of the main functions of board of directors is to monitor and discipline top management (e.g., Fama, (1980). That is to say, the corporate board is viewed as an ultimate internal monitor of the firm, and its role is to provide a relatively low-cost mechanism for replacing or reassigning top managers (Fama and Jensen, 1983a; Hermalin and Weisbach, 1998). Fama and Jensen (1983b) also argue that the corporate board can bring a valuable support function to the top managers in coping with specialized decision-making problems. Using Taiwanese dataset, Young *et al.* (2008) and Chou *et al.* (2018) provide evidence of the initial stage of the reforms in 2002. Therefore, we argue that it is important to provide further analysis on the determinants of board independence in Taiwan where the capital market is characterized as weak shareholder protection (Hsu *et al.*, 2018).

The percentage of firms with voluntary appointment of at least one independent director increases considerably from a low of 9% at the beginning of the corporate governance reforms in 2002 to 41% in 2015. Accordingly, the issue of the determinants of the voluntary appointment of independent directors for Taiwanese firms that are free from the mandatory requirement is an interesting research topic. Our main results show that Taiwanese firms with large board size tend to voluntarily appoint independent directors. In addition, we observe that firms that already have independent supervisors more willingly to appoint additional independent directors onto the board. As for ownership structure variables, ownership concentration is positively associated with voluntary appointment of independent directors. Moreover, we find that institutional ownership is a significant determinant of board independence. Our results also show that firms controlled by family members are reluctant to voluntarily appoint independent directors.

This study contributes to the corporate governance literature in several ways. First, this study extends the earlier research by using a more comprehensive dataset of non-financial Taiwanese firms, as well as employing alternative methodologies to investigate the determinants of voluntary appointment of independent directors. In particular, we add to the extant literature the important roles of board size and ownership concentration in the appointment of independent directors. Second, prior studies tend to neglect the possible issue of using a censored and fractional dependent variable, the proportion of independent directors, which might yield biased and inconsistent parameter estimates when using OLS regression estimation. Finally, this study addresses the relevant econometric issues by using the Tobit regression (Brooks, 2008), generalized linear model (Papke and Wooldridge, 1996), as well as the two stage least squares for a possible endogeneity concern (Chou *et al.*, 2018).

The remainder of this paper is structured as follows. Section 2 presents a review of the Taiwanese institutional background. Section 3 discusses the prior literature as to the determinants of board independence as well as the development of hypotheses. Section 4 explains the methodological aspects being used in the current study and the variables used in developing the hypotheses. Section 5 reports our main findings, analyses of the statistical methods applied to the sample data, and the results of robustness tests. Finally, section 6 concludes the paper.

2. Institutional Background

Taiwan has implemented a series of reforms to enhance its corporate governance mechanisms. For instance, to allow professionals without shareholdings to become independent directors, the Company Act was amended in November 2001 to abolish the constraint that directors should be elected only from among shareholders. In addition, in 2002 the TWSE amended the

rules which for the first time required firms applying for initial public offerings (IPOs) on the TWSE to appoint at least two independent directors. Similarly, in 2002 the GreTai Securities Market (GTSM) also introduced similar rules which likewise for the first time required firms applying for IPOs to appoint independent directors. Moreover, Article 14-2 of the Securities and Exchange Act, which were added in 2006, encourages firms to appoint independent directors, not less than two in number and not less than one-fifth of the total number of directors, in accordance with their articles of incorporation. This regulation, enforced from 1st January 2007, has enhanced the Taiwanese independent director system.

Later in 2006, in order to comply with the new additional regulation, the Financial Supervisory Commission (FSC, the authorities of listed firms) Interpretation required all public financial institutions such as financial holding firms, banks, bills finance firms, insurance firms, securities firms and also listed firms in the non-financial sector with paid-in capital of more than 50 billion New Taiwan Dollars (NTD) (around USD1.4 billion) to mandatorily appoint independent directors, at least two in number and at least one-fifth of the total number of directors on the board. This Interpretation was later replaced, effective on 22nd March 2011, which required all public financial institutions and those non-financial listed firms with paid-in capital over NT$10 billion (around £0.3 billion) to appoint at least two independent directors, with no less than one-fifth of the number of directors on the board. In the final stage of the reform, all listed firms are required to appoint independent directors on their boards by the end of 2016. Hence, prior to the final reform in 2016, listed firms in Taiwan were divided into two groups. In the first group, firms, which applied to be listed on the TWSE (GTSM) before 22nd (25th) February 2002, are not forced to with a few exceptions, but are free to appoint independent directors. These firms can be further divided into three sub-groups: (i) firms that do not have independent directors; (ii) firms that voluntarily appointed independent directors;

(iii) firms that mandatorily appointed independent directors. In the second group, however, according to the amended rules firms that applied to go public after 22nd (25th) February 2002 must have at least two independent directors on the board.[1]

3. Prior Literature and Development of Hypotheses

Extant studies argue that outside directors are more likely to be added to the board when a CEO nears retirement, when firms perform poorly, when firms leave product markets, and perhaps when there is a new CEO (Hermalin and Weisbach, 1988). Li (1994) uses 390 large manufacturing firms from Japan, Western Europe, and the United States to examine the relationship between structures of ownership and composition of boards of directors. The results show that an inverse relationship exists between the proportion of outside directors on the board and either high ownership concentration structure or bank control, while state-owned firms are more likely to have outside directors on the board. Similarly, Bathala and Rao (1995), find a negative relationship between the proportion of external board directors and the dividend payout ratio, the debt leverage, and the proportion of equity held by insiders. Also, board composition is found to be systematically correlated with a number of other variables such as institutional shareholding, growth, length of CEO tenure and earnings volatility.

In addition, using a sample of 583 public corporations over the ten-year period 1983–1992, Denis and Sarin (1999) conclude that changes in ownership structure and board composition are significantly related to top executive turnover, corporate control threats, and previous stock price performance, but are only weakly related to changes in firm-specific determinants including stock return variance, leverage, firm size and growth opportunities. They also find

[1] Article 9 of the Taiwan Stock Exchange Corporation Rules Governing Review of Securities Listings and Article 10 of the GreTai Securities Market Rules Governing the Review of Securities for Trading on the GTSM.

that large changes in ownership and board composition are generally followed by large-scale asset restructurings and preceded by economic shocks. Mak and Li (2001) provide evidence on the determinants and interrelationship among corporate ownership and board structure characteristics of a sample of Singapore-listed firms, which shows a negative relationship between the proportions of outside directors and managerial ownership, government ownership, and board size. Besides, firms with higher block-holder ownership, less regulation, and longer CEO tenure tend to employ a dual leadership structure. Prevost *et al.* (2002) find that the percentage of outside directors on the board is negatively associated with the percentage of inside ownership, firm size, growth opportunity and dual CEO positions, but is positively related to concentrated ownership, debt leverage and profitability, whilst the proportion of outsiders increased following the passing of the reformed company and securities law legislation in 1993 in New Zealand.

Moreover, Boone *et al.* (2007), using a panel dataset that tracks the development of board of directors from a firm's IPO until ten years later, document that: (i) board size and independence are positively related to firm size and diversification, (ii) board size is inversely related to firm-specific benefits and positively related to costs of monitoring, and (iii) board independence is inversely related to the manager's influence and positively related to restrictions on that influence. Linck *et al.* (2008) examine the development and determinants of board structure for a broad sample of 6,931 firms from 1990 to 2004, and find that board size and independence are negatively associated with growth opportunity, R&D expenditures, stock return volatility and managerial ownership, but are positively associated with firm size. Also, the board of directors is more independent when inside directors have more opportunity to extract private benefits and when the CEO has greater influence over the board. Analyzing a sample of 8,165 observations from 1992 to 2001, Coles *et al.* (2008) point out that board size and the proportion

of outsiders are positively related to firm size, diversification and leverage, while insider representation on the board is only weakly related to R&D intensity. Similarly, Guest (2008) studies the trends and determinants of board size and composition with a large sample of UK firms over the period 1981–2002. The findings conclude that board size and outside director percentage are directly impacted by advising needs and inversely impacted by CEO influence, whilst board size and the number and percentage of non-executive directors increased following the passing of the Cadbury Report.

Furthermore, Lehn *et al.* (2009) find that board size is negatively correlated with firm size but positively correlated with growth opportunity, whereas the presence of insider directors on the board is positively correlated with firm size and negatively correlated with growth opportunity. Ting (2011) has studied the determinants of board size and composition in the Taiwanese banking industry, and reveals that firm size and firm age are the key determinants of board size, and board independence decreases under the ownership of controlling shareholders and increases under the ownership of outside directors. Analyzing a large panel dataset over the period 1999–2003 in China, Chen and AI-Najjar (2012) indicate that board size is directly related to the number of supervisors, firm size, firm performance, and firm value, but is inversely related to ownership concentration, while board independence is inversely related to the number of supervisors and state ownership. De Andres *et al.* (2012) investigate the factors influencing the board composition of an international sample of commercial banks from 1996 to 2006, and find that board size and independence are higher when firms are more complex, have a low ownership concentration, and are headquartered in a civil law country; and that there is a negative effect of monitoring cost on board independence.

As shown above, there are numerous factors that determine board independence. However, in this study, in order to derive and examine hypotheses on the factors that motivate firms to voluntarily appoint independent directors, we classify the existing literature on corporate board determinants from previous discussion into the following two dimensions: board characteristics and ownership structure.

Board Characteristics and Board Independence

Prior literature argues that the quality and efficiency of the decision making of a small board is much better than that of a large board (Eisenberg *et al.*, 1998; Yermack, 1996). In addition, larger board size leads to less coordination, more communication difficulty and more free-riding issues (Ahmed *et al.*, 2006; Raheja, 2005; Ramdani and van Witteloostuijn, 2010), and thus a larger likelihood of being controlled by a dominant CEO (Jensen, 1993). Moreover, past empirical research suggests that firms with a larger board of directors tend to have more outside directors (Herrera-Echeverri *et al.*, 2016). In their analysis of a large sample of 6,931 US firms from 1990 to 2004, Linck *et al.* (2008) find that board independence is significantly and positively related to board size. Furthermore, Prevost *et al.* (2002), Hillier and McColgan (2006), and Iwasaki (2008) report that board size has a positive but statistically weak impact on board independence in New Zealand, UK, and Russia, respectively. Therefore, we expect that the larger the board size, and hence the weaker the monitoring function, the higher the demand for the oversight of independent directors, and this suggests the following hypothesis:

H1.1: Board size is positively related to the proportion of independent directors

Jensen (1993) argues that having different persons serving as the CEO and chairman of the board enhances the monitoring ability of the board. Likewise, Fama and Jensen (1983b) point

out that separating decision management and decision control power improves the effectiveness in monitoring the CEO. In addition, in empirical research based on 284 New Zealand firms from 1991 to 1995, Prevost *et al.* (2002) report that board independence is negatively associated with dual CEO positions. Moreover, in their analysis of 683 non-financial UK firms over the period 1992–1997, Hillier and McColgan (2006) document that firms which separate the roles of chairman and CEO have a higher proportion of outside directors. Similarly, using a unique dataset of 730 joint-stock Russian firms, Iwasaki (2008) finds that a board chairman appointed from the outside tends to enhance board independence. Recently, Chen and Al-Najjar (2012) have indicated that there is a negative relationship between the proportion of independent directors and CEO duality in China, using a sample 5,133 firm-year observations from 1999 to 2003. Thus we predict that when the CEO is also the chairman of the board, firms are less likely to appoint independent directors, which suggests the following hypothesis:

H1.2: Board leadership is negatively related to the proportion of independent directors

In addition to the board of directors, firms in Taiwan also have a board of supervisors, functioning in a capacity similar to that of an audit committee as required in other jurisdictions. The primary responsibilities and powers of these supervisors are to investigate and oversee directors' behaviour, audit firms' financial reports, and scrutinize firms' operations at any time. There is some overlap between the duties of the supervisors and those of independent directors. Therefore, if the supervisors fully enforce their power, then there is less need to appoint independent directors to play the role of overseers. Supporting evidence for this is provided in the findings of Young *et al.* (2008), who report a negative but slight effect of the proportion of independent supervisors on board independence, based on a sample of 943 firms listed on the

Taiwan Stock Exchange for the years 2001 and 2002. Therefore, we predict that as an alternative corporate governance mechanism, independent supervisors are a substitute for independent directors. The following hypothesis is then proposed:

H1.3: The proportion of independent supervisors is negatively related to the proportion of independent directors

Ownership Structure and Board Independence

Ownership concentration in the form of block-holders' ownership is viewed as a governance mechanism that can substitute for the monitoring function of a board of directors through the following actions: (i) facilitate takeovers (Shivdasani, 1993), (ii) remove managers who do not maximize shareholders' value (Kaplan and Minton, 1994), and (iii) suppress CEOs' excess compensation (Core *et al.*, 1999). Supporting empirical evidence, such as Li (1994) in ten industrial countries, Mak and Li (2001) in Singapore, and Chen and Al-Najjar (2012) in China, indicates that the proportion of independent directors and block-holders' ownership are substitutes, i.e. are negatively related. However, it is not clear whether in Taiwan we would necessarily observe this negative relationship. Young *et al.* (2008) observe that the higher the block-holders' ownership in Taiwan, the higher the proportion of independent directors. Further, since hostile takeovers are in practice almost non-existent in Taiwan, block-holders are unlikely to enhance monitoring by facilitating takeovers. Thus, block-holders are more likely to improve corporate governance by raising the ability to fire executives who are unable to maximize shareholders' wealth or by restraining CEOs' excess compensation. Therefore, it can be argued that the most direct and cost-effective way for block-holders to improve corporate governance is to enhance board independence (Mak and Li, 2001), i.e. by adding more independent directors to the board. Supporting evidence is provided by several empirical

studies (Iwasaki, 2008; Lasfer, 2006; Prevost *et al.*, 2002). Accordingly, we expect that when block-holders' ownership increases, the demand for independent directors also increases, which suggests the following hypothesis:

H2.1: The proportion of independent directors is positively related to block-holders' ownership.

Institutional investors are more active than others and have greater needs for better corporate governance (Coffee, 1991). Typically, institutional investors disappointed with management or firm performance can pursue a mechanism through simply selling their shareholdings (Bathala and Rao, 1995). However, as their shareholdings are normally so large, the shares cannot be sold without steep drops in stock prices and further losses (Gillan and Starks, 2000). Therefore, institutional investors have to look for other corporate governance mechanisms to reduce the conflict of interest between management and shareholders. Bathala and Rao (1995) argue that institutional investors have sought to enhance managerial accountability through the addition of outside members to the board. In addition, Brigham and Daves (2012) note that institutional investors are known to support more independent directors on the board. Moreover, in their analysis of securities litigation from 1996 to 2005, Cheng *et al.* (2010) find that defendant firms with institutional plaintiffs experience greater improvement in their board independence subsequent to the lawsuit filing. Accordingly, it is predicted that firms with a higher proportion of institutional ownership have more independent directors on the board, which suggests the following hypothesis:

H2.2: The proportion of independent directors is positively related to institutional ownership.

Families have a powerful incentive to expropriate wealth by seeking private interests at the expense of minority investors (La Porta *et al.*, 1999; Shleifer and Vishny, 1997). Hence, unlike the traditional agency problem between managers and shareholders, the agency conflict between controlling shareholders and minority shareholders might be more prevalent in family-controlled firms (Setia-Atmaja *et al.*, 2009). For example, using a sample of 5,897 financial and non-financial corporations in East Asia and Western Europe, Faccio *et al.* (2001) find that families with control greater than their cash flow rights tend to expropriate wealth. In addition, in their analysis of a sample of 253 US family-controlled firms over a four-year period from 1995 to 1998, Gomez-Mejia *et al.* (2003) indicate that family control is correlated with greater managerial entrenchment. In Taiwan, Yeh and Woidtke (2005) find that family firms are associated with strong and negative entrenchment effects or larger agency problems. Moreover, Young *et al.* (2008) report that board independence in Taiwan is negatively related to firms controlled by one family. Therefore, we expect that family-controlled firms are less likely to appoint independent directors, which suggests the following hypothesis:

H2.3: The proportion of independent directors is negatively related to family control.

4. Research Design

This study uses a dataset of firms listed on the Taiwan Stock Exchange (TWSE) for the years 2002–2015.[2] All the data regarding financial statements, stock prices, board characteristics, and ownership structure, are drawn from the Taiwan Economic Journal (TEJ) database. The preliminary sample size for firms listed on the TWSE from 2002 to 2015 is 10,479. We then

[2] Our sample period ends in 2015 due to the fact that the Taiwanese Financial Supervisory Commission has mandated that all listed firms to appoint independent directors from 2016 onwards.

exclude 539 observations for firms in the financial, securities and insurance industries, and 177 observations for foreign firms issuing depository receipts in Taiwan, because their regulatory and reporting regimes are considerably different from firms in other industries. We further exclude 383 observations for firms listed less than one year or firms with incomplete corporate governance data, and 2574 observations for firms with mandatory appointment of independent directors. We also exclude 877 observations for firms representing the lowest and highest one percent in the sample (i.e. outliers), leaving the final sample of 5,929 firm-year observations. Table 1 provides details about the sample selection process.

[Insert Table 1 here]

Given our dataset is an unbalanced panel data of different numbers of firms over a 14-year period from 2002 to 2015, we employ the panel estimation to exploit both the cross-section and time series nature of the data. We include industry dummy variables to control for industrial effects. Industry Classification Benchmark (ICB) is adopted to categorize our sample firms under nine industries: oil and gas, basic materials, industrials, consumer goods, health care, consumer services, telecommunications, utilities, and technology. Finally, we also use year dummy variables in the model to capture the regulation effect which may affect the outcome variable. The equation specified below is established to test the hypothesis for the motives for firms to voluntarily appoint independent directors.

$$\begin{aligned} \text{INDBOD\_R}_{it} = {} & \alpha_0 + \alpha_1 \text{BODSIZE}_{it} + \alpha_2 \text{DUALITY}_{it} + \alpha_3 \text{INDSUP}_{it} \\ & + \alpha_4 \text{BLOCKOWN}_{it} + \alpha_5 \text{INSTOWN}_{it} + \alpha_6 \text{FAMCON}_{it} \\ & + \sum \alpha \text{CONTROLS}_{it} + \text{INDUSTRY} + \text{YEAR} + \varepsilon_{it} \end{aligned} \tag{1}$$

$$i = 1, \dots, N;\ t = 1, \dots, T$$

where the proportion of independent directors (*INDBOD_R*) is calculated as the number of independent directors divided by the total number of directors on the board. An independent director should meet all of the board independence criteria for being independent as stated in Articles 2 and 3 of the Regulations Governing Appointment of Independent Directors and Compliance Matters for Public Companies. Board size (*BODSIZE*) is measured as the total number of directors on the board. Board leadership (*DUALITY*) is a dummy variable, which equals 1 if the CEO is also the chairman of the board of directors, and 0 otherwise. The proportion of independent supervisors (*INDSUP*) is calculated as the number of independent supervisors divided by the total number of supervisors. Similar to independent directors, an independent supervisor is also an important monitor of the firm and is defined as one who meets all of the criteria in regard to the independence of supervisors for being independent. Following Young *et al.*, block-holders' ownership (*BLOCKOWN*) is measured as the proportion of shares owned by the ten largest outside shareholders or shareholders who hold at least 5% of shares outstanding. Institutional ownership (*INSTOWN*) is measured as the proportion of shares owned by institutional shareholders. Institutional shareholders include both foreign and domestic financial institutions (e.g., investment trust funds, securities dealers). Family control (*FAMCON*) is a dummy variable, which equals 1 if over one-half of the directors are members of one family, and 0 otherwise.

Following prior literature, we include a number of control variables in the regression models: First, firm size (*FIRMSIZE*) is measured as the natural logarithm of the book value of total assets. Larger firms are expected to correlate with more complex operations which create more agency conflicts between managers and shareholders (Young *et al.*, 2008). All of the above arguments support the evidence that larger firms demand more independent directors on the board (Germain *et al.*, 2014). Therefore, the current study expects to find that in order to

mitigate the agency problems with firm size, the larger the firm size, the higher the proportion of independent directors. Second, growth opportunity (*GROWTH*) is measured as the ratio of current year sales minus prior year sales divided by prior year sales. Lehn *et al.* (2009) argue that firms with a high growth opportunity are correlated with the information asymmetries which are likely to result in higher insider ownership of equity. Consistent with this argument, Bathala and Rao (1995), and Denis and Sarin (1999), find that there is a negative relationship between growth opportunity and the proportion of independent directors. Thus, *GROWTH* is predicted to be negatively associated with board independence. Third, leverage (*LEV*) is measured as the ratio of total debt divided by the book value of total assets. Jensen and Meckling (1976) argue that conflicts between shareholders and creditors increase with firms' leverage. The demand for monitoring by independent directors is then expected to be higher among high leveraged firms (Karim *et al.*, 2020)Therefore, we expect that firms with a higher leverage tend to voluntarily appoint independent directors.

Fourth, return on assets (*ROA*) is the ratio of earnings before interest and taxes divided by the book value of average total assets. Firms with better performance tend to appoint independent directors so as to convince investors of their quality financial statements (Malik and Makhdoom, 2016; Matias Gama and Rodrigues, 2013). Therefore, we predict a positive relationship between firm performance and board independence (Chijoke-Mgbame *et al.*, 2020; Fernández-Temprano and Tejerina-Gaite, 2020; Kao *et al.*, 2019). Fifth, firm age (*FIRMAGE*) is measured as the number of years that a firm has operated. Some studies argue that firms with a longer history are more complex and demand more experience and skills (Raheja, 2005). On the other hand, Fraile and Fradejas (2014) report a negative association between firm age and board independence. Therefore, *FIRMAGE* is used to control for the potential impact of firm age on board independence, and no sign is predicted to this variable. Finally, R&D ratio (*RD*) is

calculated by dividing the ratio of R&D expenditure by total sales. Coles *et al.* (2008) argue that firms with higher R&D intensity have more inside directors. However, in their empirical research, Boone *et al.* (2007), and AlHares (2020) find a positive association of *R&D* expenditure with board independence. Thus, we use *R&D* to control its possible effect on board independence, but do not predict a direction of the relationship between *R&D* ratio and board independence. Table 2 below provides the definition of the research variables employed in the model.

[Insert Table 2 here]

Given the observed data with many observations on the dependent variable censored at zero, fixed effects estimation may not be appropriate and would yield biased and inconsistent parameter estimates, and an approach based on maximum likelihood should be used. Therefore, in order to prevent possible biased and inconsistent results from the fixed effects estimation, we use a Tobit regression by maximum likelihood method to estimate the equation (1).[3] Furthermore, there is another concern about a fractional response variable, having values that fall between zero and one. Generally, it would be beneficial to have predicted values that also fall between zero and one, but if the estimation is made by using a linear function, the predicted values may fall above one or below zero. A traditional way to deal with this problem is to conduct a logit transformation on the data and then fit the model using OLS estimation (Balassa, 1986). However, when a logit transformation is performed, there is a disadvantage of excluding all observations where the dependent variable takes values of zero or one. Therefore, a better

[3] When censored regression estimations are used, values that fall at or below/above some threshold are censored. "Even though the dependent variable is censored, the corresponding values of the independent variables are still observable." (Brooks, 2008, p.535).

alternative is to estimate by using a generalized linear model (GLM) with a logit link and a binomial family, which is proposed by Papke and Wooldridge (1996).[4] In our study, the dependent variable INDBOD_R is a proportion bounded by zero and one ($0 \leq INDBOD\_R \leq 1$). Accordingly, as a robustness test, we also employ GLM with a logit link and a binomial family to estimate the equation (1) as suggested by Papke and Wooldridge (1996; 2008).

5. Results

Descriptive Statistics

Table 3 below reports the descriptive statistics of the research variables employed in this study for samples from 2002 to 2015. The results regarding the dependent variable show that the proportion of independent directors (*INDBOD_R*) has an average of only 3.02% and a median of 0, indicating that there are still many firms which do not have independent directors. Compared with the proportions of independent directors in other countries, for example, 56%, 41%, 46%, 57% for the US (Boone *et al.*, 2007), UK (Guest, 2008), Australia (Arthur, 2001) and Singapore (Mak and Li, 2001), respectively, the proportion in Taiwan is considerably lower. One possible reason for this is that the definition of independent directors is different from other jurisdictions. In Mak and Li's (2001) paper, independent directors are defined as members of boards of directors other than executive directors, affiliated directors, and grey directors, whereas the definition of independent directors is more rigid in Taiwan (e.g., it includes professional qualification criteria and direct or indirect status).

Regarding board characteristics variables, the average number of directors on the board (*BODSIZE*) is 9.46 (with a minimum of 5 and maximum of 22), which is smaller than the mean

[4] In their later study, Papke and Wooldridge (2008) extend their earlier work on cross-sectional data to panel data, showing how to specify and estimate fractional response models by using panel data.

numbers of 11.88 and 12.03 for listed firms in the US, reported by Fitch and Shivdasani (2006), and UK, reported by De Andres *et al.* (2005), respectively; but which is larger than the mean numbers of 5.56 and 8.04 for listed firms in Australia (Arthur, 2001) and Singapore (Mak and Li, 2001), respectively. In addition, approximately 29.8% of the sample firms' CEOs are also the chairmen of the board of directors (*DUALITY*). Lastly, the proportion of independent supervisors (*INDSUP*) is on average 3.10% with a median of 0, implying that most supervisors in the sample firms are not independent.

The next three rows in the table report the ownership structure variables. The average (median) block-holders' ownership (*BLOCKOWN*) is 19.75% (18.11%), with a maximum of 79.81%. In addition, the average (median) institutional ownership (*INSTOWN*) has a low of 1.99% (0.21%), which is considerably lower than the mean of 34.16% in the US (Linck *et al.*, 2008). This result implies that institutional investors constitute only a small proportion of firm ownership for the sample firms. Lastly, based on the definition of this study, nearly 72% of the sample firms' boards of directors are controlled by family members (*FAMCON*).

With regard to control variables, the average firm size (*FIRMSIZE*) is about 15.80 billion NTD (New Taiwan Dollars), the average growth opportunity (*GROWTH*) is 6.13%, and the average debt ratio (*LEV*) is 37.54%. In addition, the average return on asset (*ROA*) is 4.80%, the average firms age is 33.07 years, and the average *R&D* ratio is a low 1.92%.

[Insert Table 3 here]

Table 4 reports the results of the correlation matrix amongst the independent variables used in the regressions for the sample over the period 2002–2015. The correlation coefficients between

all independent variables are small (with a maximum absolute value of 0.294), suggesting no multicollinearity problem.[5] In the current study, we also use the Variance Inflation Factor (VIF) to double-check for any multicollinearity issue. The largest VIF is for the firm size (*FIRMSIZE*) (1.36), whereas the lowest VIF is for the board leadership (*DUALITY*) and proportion of independent supervisors (*INDSUP*) (1.05). As a result, the VIFs vary from 1.05 to 1.36 (with a mean of 1.18, not reported in the table), which are all lower than the critical value of 10. Therefore, the regression models used to test the hypotheses are relatively free from multicollinearity problems. The highest absolute value of correlation coefficient is the correlation between the firm age (*FIRMAGE*) and R&D ratio (*RD*) (r = -0.294, p < 0.01), indicating that firms with higher R&D expenditures are younger than those with lower R&D expenditures. In addition, firm size (*FIRMSIZE*) is positively related to the board size (*BODSIZE*) (r = 0.289, p < 0.01), implying that large firms tend to have a larger board of directors than do small firms. Moreover, the larger the firm size (*FIRMSIZE*), the larger the institutional ownership (*INSTOWN*) (r = 0.304, p < 0.01), showing that large firms are more attractive to institutional investors.

[Insert Table 4 here]

Multivariate Results

Column 1 of Table 5 provides the fixed regression results of board independence on board characteristics, ownership structure, and control variables, i.e. the model (1). With respect to board characteristics variables, the coefficient of *BODSIZE* is statistically insignificant, suggesting that board size is not a significant determinant of voluntary appointment of independent directors. This result does not support Hypothesis 1.1 but is consistent with Hillier and McColgan (2006), and Iwasaki (2008). In addition, the coefficient of *DUALITY* is

[5] Multicollinearity may be a problem when the correlation coefficient exceeds 0.80 (Gujarati, 1995)

insignificant, thus contradicting Hypothesis 1.2. In line with Young *et al.* (2008), and Chen and Al-Najjar (2012), this result indicates that board independence is not affected by board leadership (i.e., having the same person serving as both CEO and chairman of the board). Moreover, the relationship between *INDSUP* and *INDBOD_R* is significantly positive ($p < 0.01$). The result fails to support Hypothesis 1.3 arguing a negative association, but is consistent with the intuition that firms which already have independent supervisors find it easier to accept more independent directors on the board.

As regards ownership structure variables, *INDBOD_R* is positively related to *BLOCKOWN* and significant at the 1% level, supporting Hypothesis 2.1. This result is in line with the evidence documented by Prevost *et al.* (2002), and Iwasaki (2008). In addition, the coefficient of *INSTOWN* is positive and significant at the 5% level, suggesting that firms with higher institutional ownership tend to voluntarily appoint independent directors. Therefore, Hypothesis 2.2 is supported and is consistent with the study of Chung *et al.* (2019), and Bansal and Thenmozhi (2020). In contrast, consistent with Young *et al.* (2008), the coefficient of *FAMCON* is negative and significant at the 1% level. This result supports Hypothesis 2.3 and the evidence provided by Vieira (2018), and Crisóstomo and de Freitas Brandão (2019), indicating that firms controlled by family members are reluctant to appoint independent directors.

In terms of control variables, the coefficient of *FIRMSIZE* is significantly and positively associated with *INDBOD_R* at the 1% level, and thus in line with our expectation. This result implies that the bigger the firm size, the higher the board independence, which is similar to the research of Baker and Gompers (2003), and Guest (2008), but contradicts other studies (Berry *et al.*, 2006). In addition, the relationship between *GROWTH* and *INDBOD_R* is statistically

insignificant. The result suggests that growth opportunity is not a significant determinant of voluntary appointment of independent directors, which is consistent with the findings of Hossain *et al.* (2000), and Mak and Li (2001). Moreover, the coefficient of LEV is statistically insignificant, which is not in line with our expectation. The result indicates that board independence is not affected by the firm's leverage level, which matches the results of Lasfer (2006), and Hillier and McColgan (2006).

The result further shows that the coefficient of *ROA* is positive but statistically insignificant, indicating that firms' performance is not a significant determinant of board independence, and thus contradicting our expectation. These results are similar to those of Roudaki (2018), and Wang *et al.* (2019). In addition, the coefficient of *FIRMAGE* is significantly negative ($p < 0.01$), suggesting that older firms are less likely to make voluntary appointments of independent directors, which is in line with the studies of Denis and Sarin (1999), and Hillier and McColgan (2006). Finally, as expected, the relationship between *R&D* and *INDBOD_R* is significantly positive ($p < 0.01$). The result suggests that firms that have more *R&D* expenditures are more likely to voluntarily appoint independent directors, which is similar to the studies of Boone *et al.* (2007), and Coles *et al.* (2008).

[insert Table 5 here]

Additional analyses

As mentioned in the previous section, given that our dependent variable *INDBOD_R* is censored at zero, the fixed effects estimation might yield biased and inconsistent parameter estimates. Accordingly, to prevent a possible problem from the fixed effects estimation, we employ a Tobit model based on maximum likelihood method to estimate equation (1). The

results of the Tobit regression are presented in column 2 of Table 5. These empirical results remain qualitatively similar to those from the fixed effects estimation in column 1, except for the results of *BODSIZE* and *LEV*. In the Tobit regression, the coefficient of *BODSIZE* is positive and significant at the 5% level, indicating that firms with large boards tend to voluntarily appoint independent directors. This result supports Hypothesis 1.1 and is consistent with Linck *et al.* (2008). Similarly, the coefficient of *LEV* is significantly and positively associated with INDBOD_R ($p < 0.05$), which is consistent with our expectation. The result suggests that the higher the firm's leverage level, the more the need for independent directors, which matches the results of Linck *et al.* (2008), and Iwasaki (2008).

As discussed earlier, when using a linear estimation, there might be a problem from a fractional response variable (i.e., $0 \leq INDBOD\_R \leq 1$). Therefore, as a robustness check, we also use GLM with a logit link and a binomial family to estimate the equation (1). The results of the GLM regression are presented in column 3 of Table 5. Our findings are qualitatively similar to the regression results from the fixed effects estimation in column 1, and the Tobit model in column 2.

Finally, the independent variables used in the current study, i.e. board characteristics and ownership structure, may be determined simultaneously with the board independence. As a result, the panel regression model may be biased and inconsistent, and therefore cannot be used to make inferences about the causality of the relationship. As a robustness check, this study addresses the possible impact of endogeneity by using the instrumental variable method with a single-equation two-stage least squares (2SLS) estimation (Patro *et al.*, 2018; Uribe-Bohorquez *et al.*, 2018) to re-estimate the equation (1). Lagged values of board characteristics and ownership structure variables are employed as the instrumental variables to control for

potential endogeneity. The results for 2SLS regression are presented in Table 6, and are qualitatively consistent with the regression results from the fixed effects estimation in Table 5.

[insert Table 6 here]

6. Conclusion

Since February 2002, both the TWSE and GTSM have mandated IPO firms to have at least two independent directors on their boards. The authority further gradually expands the scope of mandatory requirement of board independence for listed firms in 2006 and 2011. However, there are numerous firms not required by these regulations voluntarily adding independent directors to the boards. To exploit this unique setting, this paper investigates the determinants of voluntary appointment of independent directors using a dataset of Taiwanese non-financial listed firms. Our findings indicate that Taiwanese firms with large board size tend to voluntarily appoint independent directors. However, we find that there is no linkage between board independence and board leadership. In addition, we observe that firms which already have independent supervisors more easily accept further independent directors on the board. As regards ownership structure, board independence is positively related to ownership concentration. We also observe that institutional ownership is a significant determinant of board independence. In contrast, however, our results show that firms controlled by family members are generally reluctant to voluntarily appoint independent directors.

Our findings are important for managers, shareholders, creditors and policy makers, and have the following main implications. In determining the voluntary appointment of independent directors, our findings indicate that independent supervisors, outside shareholders and institutional investors are significant factors in influencing internal and external corporate

governance mechanisms. In contrast, firms with boards of directors dominated by family members (i.e., family-controlled firms) tend not to host independent directors and usually refuse to enhance the quality of corporate governance. The results imply that the persistent expropriation problems, emanated from family-dominated boards, between controlling and minority shareholders should be a focus of the government interference. We suggest several possible avenues for future research. First, Hwang and Kim (2009) find that when considering informal social ties between directors and CEOs, the independence of US boards drops to 62% from 87% under the conventional regulatory definition. Therefore, refining the definition of independence beyond conventional regulatory definitions could advance our understanding as to determinants of board independence. Second, our findings indicate that family-controlled firms are associated with weak internal corporate governance mechanisms. Additionally, Hsu *et al.* (2018) find that family firms tend not to enhance external corporate governance mechanisms, i.e. higher-quality auditors. Accordingly, it would be interesting to investigate further whether family firms lead to higher occurrences of financial fraud.

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Table 1 Definition of the research variables

Variables	Acronym	Definition	Expected sign
Dependent variable			
The proportion of independent directors	INDBOD_R	The proportion of independent directors over the total number of directors on the board.	
Board characteristics variables			
Board size	BODSIZE	The total number of directors on the board.	+
Board leadership	DUALITY	A dummy variable, which equals 1 if the CEO is also the chairman of the board of directors, and 0 otherwise.	−
The proportion of independent supervisors	INDSUP	The proportion of independent supervisors over the total number of supervisors.	−
Ownership structure variables			
Block-holders' ownership	BLOCKOWN	The proportion of shares owned by the ten largest outside shareholders or shareholders who hold at least 5% of shares outstanding.	+
Institutional ownership	INSTOWN	The proportion of shares owned by institutional shareholders.	+
Family control	FAMCON	A dummy variable, which equals 1 if over one-half of the directors are members of one family, and 0 otherwise.	−
Control variables			
Firm size	FIRMSIZE	The natural logarithm of the book value of total assets.	+
Growth opportunity	GROWTH	The ratio of current year sales minus prior year sales over prior year sales.	−
Leverage	LEV	The ratio of total debt to total assets.	+
Return on assets	ROA	The ratio of earnings before interest and taxes over the book value of average total assets.	+
Firm age	FIRMAGE	The number of years that a firm has operated.	?
R&D ratio	RD	The ratio of R&D expenditure to total sales.	?

Table 2 Sample selection process

	Firm-year observations
Preliminary sample size (2002–2015)	10,479
Less:	
Observations in the financial sector	-539
Observations in depository receipts sector	-177
Observations listed less than one year or observations with incomplete data regarding corporate governance information	-383
Observations with mandatory appointment of independent directors	-2,574
Outliers	-877
Final sample size	5,929

Table 3 Descriptive statistics

Variables	Min.	25%	Mean	Median	75%	Max.	SD
Dependent variable							
INDBOD_R (%)	0.000	0.000	3.023	0.000	0.000	57.143	8.002
Board characteristics variables							
BODSIZE	5.000	7.000	9.458	9.000	10.000	22.000	2.671
DUALITY	0.000	0.000	0.298	0.000	1.000	1.000	0.457
INDSUP (%)	0.000	0.000	3.097	0.000	0.000	100.000	11.874
Ownership structure variables							
BLOCKOWN (%)	0.000	11.420	19.745	18.110	26.060	79.810	11.722
INSTOWN (%)	0.000	0.000	1.990	0.210	2.550	62.260	3.587
FAMCON	0.000	0.000	0.722	1.000	1.000	1.000	0.448
Control variables							
FIRMSIZE	12.188	14.984	15.798	15.655	16.436	20.890	1.202
GROWTH (%)	-67.330	-7.240	6.125	3.550	15.980	176.120	25.789
LEV (%)	5.540	25.440	37.543	37.000	48.440	81.250	15.949
ROA (%)	-22.860	1.510	4.795	4.590	8.520	27.220	6.791
FIRMAGE	2.995	24.096	33.065	32.537	41.452	69.715	11.996
RD (%)	0.000	0.000	1.922	0.620	2.520	23.710	3.178

Notes: N=5,929. The definitions of the research variables are as follows. INDBOD_R is the proportion of independent directors over the total number of directors on the board; BODSIZE is the total number of directors on the board; DUALITY is a dummy variable, which equals 1 if the CEO is also the chairman of the board of directors, and 0 otherwise; INDSUP is the proportion of independent supervisors over the total number of supervisors; BLOCKOWN is the proportion of shares owned by the big ten largest outside shareholders or shareholders who hold at least 5% of shares outstanding; INSTOWN is the proportion of shares owned by institutional shareholders; FAMCON is a dummy variable, which equals 1 if over one-half of the directors are served by members of one family, and 0 otherwise; FIRMSIZE is the natural logarithm of the book value of total assets; GROWTH is the ratio of current year sales minus prior year sales over prior year sales; LEV is the ratio of total debt to total assets; ROA is the ratio of earnings before interest and taxes over the book value of average total assets; FIRMAGE is the number of years that the firm has operated; RD is the ratio of R&D expenditure to total sales. For the dummy (binary) variables, the mean indicates the proportion of sample firms with value equals to 1 for the variable.

Table 4 Variance Inflation Factor and Pearson correlation matrix

	Variables	VIFs	1	2	3	4	5	6	7	8	9	10	11
1	BODSIZE	1.16	1										
2	DUALITY	1.05	-0.152[a]	1									
3	INDSUP	1.05	-0.012	0.062[a]	1								
4	BLOCKOWN	1.09	-0.137[a]	-0.019	-0.053[a]	1							
5	INSTOWN	1.14	0.087[a]	-0.038[a]	-0.015	0.080[a]	1						
6	FAMCON	1.13	0.007	-0.119[a]	-0.080[a]	0.006	0.004	1					
7	FIRMSIZE	1.36	0.289[a]	-0.138[a]	-0.018	-0.082[a]	0.304[a]	0.189[a]	1				
8	GROWTH	1.14	0.019	0.001	0.067[a]	-0.056[a]	0.015	-0.006	0.090[a]	1			
9	LEV	1.26	-0.020	-0.035[a]	-0.018	-0.008	-0.042[a]	0.027[b]	0.131[a]	0.074[a]	1		
10	ROA	1.33	0.050[a]	-0.032[b]	0.075[a]	0.043[a]	0.177[a]	-0.072[a]	0.183[a]	0.290[a]	-0.272[a]	1	
11	FIRMAGE	1.25	0.142[a]	-0.090[a]	-0.175[a]	0.151[a]	0.045[a]	0.205[a]	0.111[a]	-0.114[a]	-0.064[a]	-0.098[a]	1
12	RD	1.23	-0.057[a]	0.091[a]	0.114[a]	-0.144[a]	0.040[a]	-0.194[a]	-0.045[a]	-0.040[a]	-0.222[a]	0.032[b]	-0.294[a]

Notes: N=5,929. The definitions of the research variables are as follows. BODSIZE is the total number of directors on the board; DUALITY is a dummy variable, which equals 1 if the CEO is also the chairman of the board of directors, and 0 otherwise; INDSUP is the proportion of independent supervisors over the total number of supervisors; BLOCKOWN is the proportion of shares owned by the ten largest outside shareholders or shareholders who hold at least 5% of shares outstanding; INSTOWN is the proportion of shares owned by institutional shareholders; FAMCON is a dummy variable, which equals 1 if over one-half of the directors are served by members of one family, and 0 otherwise; FIRMSIZE is the natural logarithm of the book value of total assets; GROWTH is the ratio of current year sales minus prior year sales over prior year sales; LEV is the ratio of total debt to total assets; ROA is the ratio of earnings before interest and taxes over the book value of average total assets; FIRMAGE is the number of years that the firm has operated; RD is the ratio of R&D expenditure to total sales. [a] Significant at the 0.01 level. [b] Significant at the 0.05 level. [c] Significant at the 0.10 level.

Table 5 Regression results of the determinants of board independence

		Dependent variable = INDBOD_R		
Independent Variables	Expected Sign	*Fixed Effects*	*Tobit*	*GLM*
Constant	?	-0.099***	-1.020***	-8.094***
		(0.016)	(0.090)	(0.534)
BODSIZE	+	-0.000	0.005**	-0.002
		(0.000)	(0.002)	(0.015)
DUALITY	−	0.003	0.017	0.114
		(0.002)	(0.013)	(0.076)
INDSUP	−	0.002***	0.009***	0.038***
		(0.000)	(0.000)	(0.002)
BLOCKOWN	+	0.000***	0.002***	0.012***
		(0.000)	(0.001)	(0.003)
INSTOWN	+	0.001**	0.004**	0.022***
		(0.000)	(0.002)	(0.008)
FAMCON	−	-0.025***	-0.111***	-0.709***
		(0.003)	(0.013)	(0.077)
FIRMSIZE	+	0.008***	0.033***	0.232***
		(0.001)	(0.006)	(0.036)
GROWTH	−	-0.000	-0.000	-0.002
		(0.000)	(0.000)	(0.002)
LEV	+	0.000	0.001**	0.004
		(0.000)	(0.000)	(0.003)
ROA	+	0.000	0.001	0.005
		(0.000)	(0.001)	(0.006)
FIRMAGE	?	-0.000***	-0.002***	-0.012***
		(0.000)	(0.001)	(0.004)
RD	?	0.001***	0.008***	0.037***
		(0.000)	(0.002)	(0.010)
Industry		Yes	Yes	Yes
Year		Yes	Yes	Yes
Adjusted R^2		0.245		
Pseudo R^2			0.341	
Model *F*		28.609***	47.813***	
Log likelihood		7412.962	-1248.590	-562.025

*Notes: N=5,929. The definitions of the research variables are as follows. BODSIZE is the total number of directors on the board; DUALITY is a dummy variable, which equals 1 if the CEO is also the chairman of the board of directors, and 0 otherwise; INDSUP is the proportion of independent supervisors over the total number of supervisors; BLOCKOWN is the proportion of shares owned by the ten largest outside shareholders or shareholders who hold at least 5% of shares outstanding; INSTOWN is the proportion of shares owned by institutional shareholders; FAMCON is a dummy variable, which equals 1 if over one-half of the directors are served by members of one family, and 0 otherwise; FIRMSIZE is the natural logarithm of the book value of total assets; GROWTH is the ratio of current year sales minus prior year sales over prior year sales; LEV is the ratio of total debt to total assets; ROA is the ratio of earnings before interest and taxes over the book value of average total assets; FIRMAGE is the number of years that the firm has operated; RD is the ratio of R&D expenditure to total sales. The values in parentheses are robust standard errors. * Significant at the 0.01 level. ** Significant at the 0.05 level. *** Significant at the 0.10 level. Similar to the R^2 of the OLS model, pseudo R^2 measures the fitness of the Tobit regression mode; larger pseudo R^2 statistics indicate that more of the variation is explained by the model, to a maximum of 1.*

Table 6 2SLS Regression Results

Independent Variables	Expected Sign	Dependent variable = INDBOD_R
Constant	?	0.002
		(0.015)
BODSIZE	+	-0.001**
		(0.000)
DUALITY	−	0.003
		(0.002)
INDSUP	−	0.003***
		(0.000)
BLOCKOWN	+	0.000***
		(0.000)
INSTOWN	+	0.001***
		(0.000)
FAMCON	−	-0.021***
		(0.003)
FIRMSIZE	+	0.007***
		(0.001)
GROWTH	−	-0.000
		(0.000)
LEV	+	0.000
		(0.000)
ROA	+	0.000
		(0.000)
FIRMAGE	?	-0.000***
		(0.000)
RD	?	0.001***
		(0.000)
Industry		Yes
Year		Yes
Adjusted R^2		0.241
Model *F*		49.039***

*Notes: N=5,871. The definitions of the research variables are as follows. BODSIZE is the total number of directors on the board; DUALITY is a dummy variable, which equals 1 if the CEO is also the chairman of the board of directors, and 0 otherwise; INDSUP is the proportion of independent supervisors over the total number of supervisors; BLOCKOWN is the proportion of shares owned by the ten largest outside shareholders or shareholders who hold at least 5% of shares outstanding; INSTOWN is the proportion of shares owned by institutional shareholders; FAMCON is a dummy variable, which equals 1 if over one-half of the directors are served by members of one family, and 0 otherwise; FIRMSIZE is the natural logarithm of the book value of total assets; GROWTH is the ratio of current year sales minus prior year sales over prior year sales; LEV is the ratio of total debt to total assets; ROA is the ratio of earnings before interest and taxes over the book value of average total assets; FIRMAGE is the number of years that the firm has operated; RD is the ratio of R&D expenditure to total sales. The values in parentheses are robust standard errors. * Significant at the 0.01 level. ** Significant at the 0.05 level. *** Significant at the 0.10 level.*